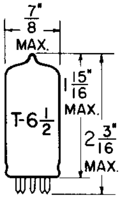
TUNG-SOL

TWIN TRIODE

MINIATURE TYPE

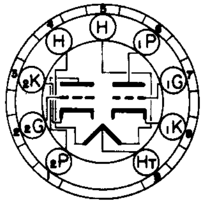


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.35 AMP.
12.6 VOLTS 0.175 AMP.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
9 PIN BASE

9A

THE 5751WA IS A RUGGEDIZED, HIGH MU TWIN TRIODE OF THE NINE-PIN MINIATURE CONSTRUCTION. THE TWO TRIODE SECTIONS ARE ELECTRICALLY INDEPENDENT, ALLOWING SIMULTANEOUS USE OF THE TWO IN COMPLETELY DIFFERENT APPLICATIONS. THE HEATER CENTER-TAP PERMITS OPERATION FROM EITHER A 6.3 OR 12.6 VOLT SUPPLY. THE 5751WA IS ADAPTABLE TO LOW LEVEL INPUT APPLICATIONS WHERE HIGH VOLTAGE GAIN AND LOW HEATER POWER ARE IMPORTANT CONSIDERATIONS. OTHER GENERAL APPLICATIONS INCLUDE VOLTAGE AMPLIFIERS, PHASE INVERTERS, AND MULTIVIBRATORS. CONTROLS ON THE PRODUCT AVERAGE FOR SUCH CHARACTERISTICS AS PLATE CURRENT, TRANSCONDUCTANCE AND AMPLIFICATION FACTOR ASSURE THAT THESE CRITICAL CHARACTERISTICS WILL REMAIN WELL CENTERED. SINCE IT MUST BE ABLE TO WITHSTAND SEVERE MECHANICAL TESTS TO MEET TEST SPECIFICATIONS, THE 5751WA IS ESPECIALLY SUITED FOR USE IN MILITARY OR INDUSTRIAL AIRBORNE EQUIPMENT WHICH MAY BE SUBJECTED TO SEVERE SHOCK AND VIBRATION.

DIRECT INTERELECTRODE CAPACITANCES

	WITHOUT SHIELD	
GRID TO PLATE #1 (RATED)	1.4	μμf
MAXIMUM	1.70	μμf
MINIMUM	1.10	μμf
GRID TO PLATE #2 (RATED)	1.4	μμf
MAXIMUM	1.70	μμf
MINIMUM	1.10	μμf
INPUT (RATED)	1.4	μμf
MAXIMUM	1.70	μμf
MINIMUM	1.10	μμf
OUTPUT (SECTION #1) (RATED)	0.46	μμf
MAXIMUM	0.70	μμf
MINIMUM	0.22	μμf
OUTPUT (SECTION #2) (RATED)	0.36	μμf
MAXIMUM	0.54	μμf
MINIMUM	0.18	μμf

RATINGS

ABSOLUTE MAXIMUM VALUES

HEATER VOLTAGE	6.3±10%	12.6±10%	VOLTS
MAXIMUM DC PLATE VOLTAGE	330		VOLTS
MAXIMUM PLATE DISSIPATION (EACH SECTION)	0.8		WATT
MAXIMUM HEATER-CATHODE VOLTAGE	±100		VOLTS
MAXIMUM DC CATHODE CURRENT (EACH SECTION)	22		mA
MAXIMUM BULB TEMPERATURE	±165		°C

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TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER – EACH TRIODE SECTION

HEATER VOLTAGE	6.3	12.6	6.3	12.6	VOLTS
HEATER CURRENT	0.35	0.175	0.35	0.175	AMP.
PLATE VOLTAGE	100		250		VOLTS
AMPLIFICATION FACTOR	70		70		
GRID BIAS VOLTAGE	–1		–3		VOLTS
PLATE RESISTANCE	58 000		58 000		OHMS
TRANSCONDUCTANCE	1 200		1 200		μMHOS
PLATE CURRENT	0.8		1.0		mA

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

E_f = 12.6V, E_b = 250Vdc, E_c =–3Vdc
(EXCEPT AS MODIFIED BELOW)

	INITIAL				500 HOUR LIFE TEST		
	INDIVIDUAL MIN.	INDIVIDUAL MAX.	PROD. AVG. MIN.	PROD. AVG. MAX.	INDIVIDUAL MIN.	INDIVIDUAL MAX.	
HEATER CURRENT	160	190	---	---	160	190	mA
HEATER–CATHODE LEAKAGE[A] (E_{hk}=±100Vdc)	---	±10	---	---	---	±10	μAdc
GRID CURRENT (1) (R_g=1.0 MEG.)	0	–0.4	---	---	0	–0.4	μAdc
PLATE CURRENT (1)	0.4	1.8	0.7	1.3	---	---	mAdc
AC AMPLIFICATION[B] (E_{BB}=100Vdc, E_c=0, E_{sig}=0.2Vac, R_p=0.5 MEG, R_g=10 MEG.)	7.5	---	---	---	6.5	---	Vac
INSULATION OF ELECTRODES[C] (E_f=12.6V, E (g-all)= 100Vdc, g neg., E(p-all)= 300 Vdc, p neg.) R(g-all)	500	---	---	---	250	---	MEGOHMS
R(p-all)	500	---	---	---	250	---	MEGOHMS
PLATE CURRENT (2) (E_c =–10.5Vdc)	---	10	---	---	---	---	μAdc
PLATE CURRENT (1) DIFFERENCE BETWEEN SECTIONS	---	0.6	---	---	---	---	mAdc
TRANSCONDUCTANCE (1)	900	1600	1075	1325	---	---	μMHOS
Δ TRANSCONDUCTANCE (2)[D] E_f=11.4V)	---	15	---	---	---	---	PERCENT
GRID CURRENT (2)[E] (E_f=14V)	0	–1.5	---	---	---	---	μAdc
AMPLIFICATION FACTOR	55	85	62	78	---	---	

SPECIAL REQUIREMENTS

	MIN.	MAX.	
VARIABLE FREQUENCY VIBRATION[FA] (R_p=10,000)	---	100	mVac
VIBRATIONAL FATIGUE[G]	---	---	
SHOCK[H] (HAMMER ANGLE = 42°, E_{hk} =100 Vdc, HEATER POS., R_g = 0.1 MEG)	---	---	
POST SHOCK AND VIBRATIONAL FATIGUE TEST END POINTS			
LOW FREQUENCY VIBRATION	---	150	mVac
HEATER–CATHODE LEAKAGE		±30	μAdc
AC AMPLIFICATION	6.5	---	Vac
GRID CURRENT (1)	0	–0.6	μAdc
GLASS STRAIN[J]	---	---	
CONTINUITY AND SHORT[K]	---	---	
NOISE AND MICROPHONICS[LAMN] (E_f = 12.6Vac, E_{hk} = 0, E_{bb} = 300Vdc, E_c = 0, R_p = 0.1 MEG.)	---	100	mVac

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TUNG-SOL

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SPECIAL REQUIREMENTS - CONT'D.

	MIN.	MAX.	
LOW FREQUENCY VIBRATION[OA] (R_p = 2000)	---	100	mVac
LOW PRESSURE VOLTAGE BREAKDOWN[P] (PRESSURE = 55±5 mm mercury, TEMP. =25±5°C, HUMIDITY =0, VOLTAGE =500 Vac, 60 CYCLES, SINUSOIDAL WAVEFORM)	500	----	Vac
1 HOUR STABILITY LIFE TEST (INTERMITTENT LIFE TEST CONDITIONS)	---	---	
STABILITY LIFE TEST END POINTS			
Δ TRANSCONDUCTANCE (1)	---	10	PERCENT
100 HOUR SURVIVAL RATE LIFE TEST (INTERMITTENT LIFE TEST CONDITIONS OR EQUIVALENT	---	---	
HEATER CYCLING LIFE TEST (E_f = 7.5V, E_{hk} = 135 Vdc, HEATER POSITIVE, E_{c1} = E_b = 0)	---	---	
HEATER CYCLING LIFE TEST END POINTS HEATER CATHODE LEAKAGE	---	±20	µAdc
INTERMITTENT LIFE TEST (E_{hk} =135 Vdc, HEATER POSITIVE, R_g =0.5 MEG., MIN. BULB TEMPERATURE = 165°C	---	---	

NOTES

[A] TIE 1_p TO 2_p, 1_g to 2_g, 1_k to 2_k. (PARASITIC SUPPRESSORS OF 50 OHMS MAXIMUM PERMITTED.

[B] SEE MIL-E-1C 4.10.11.2

[C] SEE MIL-E-1C 4.8.2

[D] THE VALUE OF TRANSCONDUCTANCE (2) SHALL APPLY TO INDIVIDUAL TUBES AND IS EXPRESSED;

$$\frac{(\text{SM AT } 12.6)-(\text{SM AT } 11.4)}{(\text{SM AT } 12.6)} \times 100$$

[E] PRIOR TO THIS TEST, TUBES TO BE PREHEATED FIVE (5) MINUTES AT CONDITIONS INDICATED. TEST IMMEDIATELY AFTER PRE-HEATING. E_f=14.0V, E_{c1}=-3.0Vdc, R_k=0 OHMS, E_b=250Vdc, R_g/g=0.5 MEG.

[F] SEE MIL-E-1C 4.9.20.3

[G] SEE MIL-E-1C 4.9.20.6

[H] SEE MIL-E-1C 4.9.20.5

[J] GLASS STRAIN TEST CONSISTS OF COMPLETELY SUBMERGING THE TUBE INTO BOILING WATER (97°C-100°C) FOR A PERIOD OF 15 SECONDS, THEN IMMEDIATELY PLUNGING INTO COLD WATER (0°C ±3°C). THE AMOUNT OF WATER SHALL BE AT LEAST (2) LITERS PER 15 TUBES. TUBES FOR THIS TEST SHALL HAVE BEEN EXHAUSTED A MINIMUM OF 48 HOURS PRIOR TO PERFORMANCE OF THIS TEST. REJECT FOR EVIDENCE OF AIR LEAK.

[K] SEE MIL-E-1C 4.7.5

[L] SEE MIL-E-1C 4.10.3.5

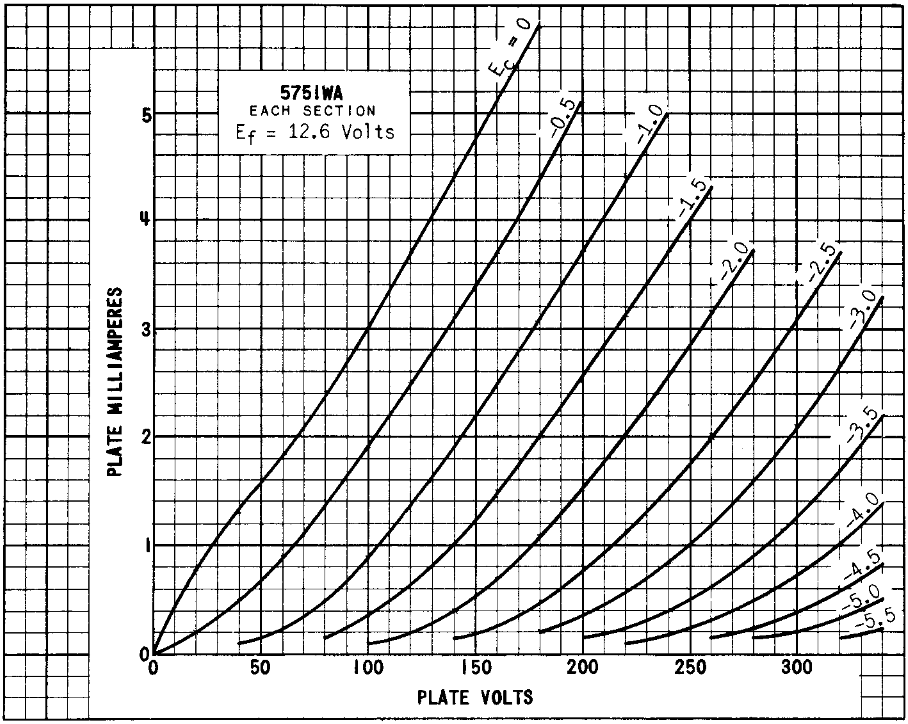
[M] TIE CATHODES TOGETHER AND GROUND THRU A 1500 OHM RESISTOR. GRIDS ARE GROUNDED.

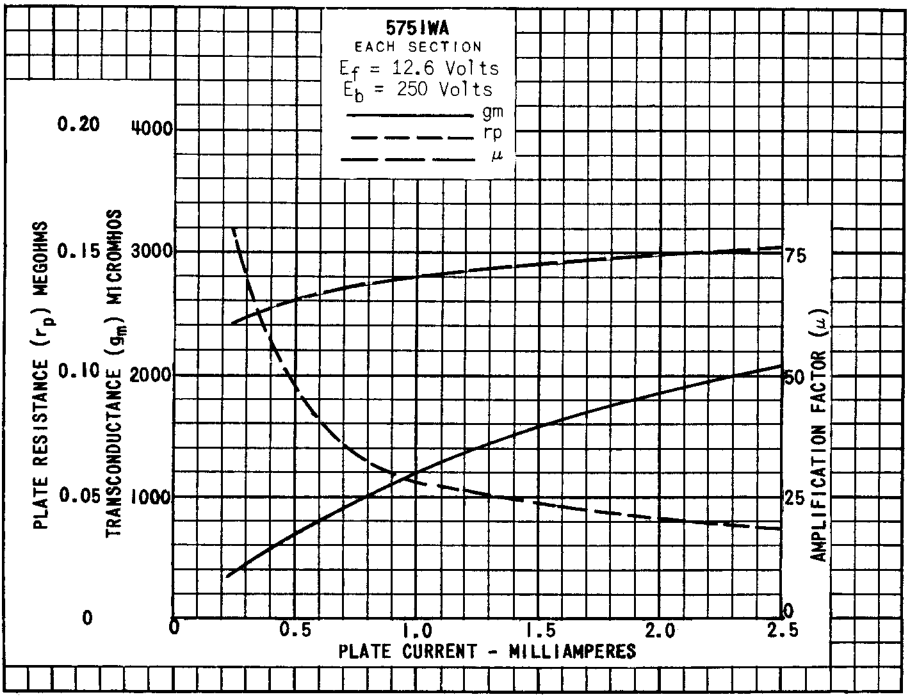
[N] THE CATHODE RESISTOR SHALL BE SHUNTED WITH A CAPACITIVE REACTANCE NOT EXCEEDING 3 OHMS @ 60 CYCLES.

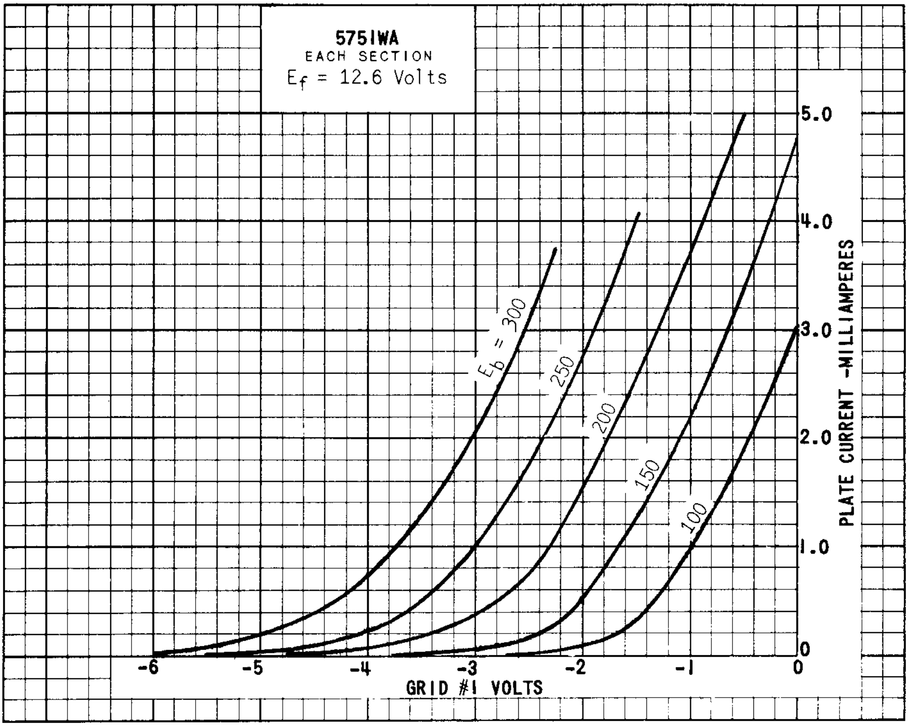
[O] SEE MIL-E-1C 4.9.20.4

[P] BREAKDOWN SHALL BE DEFINED AS THE VOLTAGE AT WHICH ARCING OCCURS BETWEEN ANODE BASE PIN AND ADJACENT PINS.

5751WA
PREMIUM TUBE






5751WA
EACH SECTION
Ef = 12.6 Volts
Eb = 300
250
200
150
100
5.0
4.0
3.0
2.0
1.0
0
PLATE CURRENT -MILLIAMPERES
-6
-5
-4
-3
-2
-1
0
GRID #1 VOLTS